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ABSTRACT

This discussion of the technological revolution and the federal role in the leadership of education cites several reports which point out the deterioration of the educational system, and describes various activities initiated by the Federal Government for the improvement of education through technology. Projects include continued assistance to school districts in developing technology for their own needs; provisions for training state and local leaders in technology; using educational television to teach science; establishing a national network to identify exemplary technological programs and assist school districts in implementing such programs; and funding selected schools providing occupational training for secondary students and using technology for classroom management and teaching mathematics and reading. Grants have been awarded to 12 school-based technology programs to serve as demonstration sites using interactive technology for teaching physics; a school/industry partnership program to train teachers; use of the computer to teach math, problem solving, science, word processing, and computer literacy; and funding for surveys on computer usage in schools. Conferences have been sponsored to explore the research needs of technology and contracts have been awarded to study current computer software and to assist small businesses in aiding the handicapped. Included are comments on the use of technology in educating health care professionals and in providing improved patient care. (DJR)

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"Meeting the Challenge of Excellence in Health Professions Education Through Technology"

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Good Morning.

It is a great pleasure to be here in the great city of Dallas, Texas and to have the opportunity to address such an outstanding professional group as the Health Education Media Association. Your invitation to come and meet with you was very much appreciated.

One would have had to live on an island in isolation during the past decade or been a visitor from outer space in order not to be cognizant of the great impact of technology in the field of education. Walking the halls of the exhibition center, viewing displays, and engaging in just casual conversation with the many people gathered for meetings in the next few days give a sense of both awe and excitement for those of us who recognize that we have only touched the surface on how the new technologies can improve the efficiency and effectiveness of the work in our own individual professions. Many of us will be bringing new ideas here over the next few days and hopefully will be returning not only with new ideas but a sense of enthusiasm to bring about a better world in the education field through technology.

If there is one obvious conclusion that all of us could make about our present day society it is this axiom: we--here in the United States as well as the world--are moving from "The Industrial Age" to "The Information Age."

What will be the outstanding feature of "The Information Age"? In almost all professions there will be a premium on the gathering and mastery of large bodies of information. The rapid accumulation and access to this information will be the outstanding characteristic. A variety of machines will be able to store this information gathered from

multiple sources. A previous age's challenge to research and gather information will receive less attention as a higher priority will be placed on the ability to access the correct information needed for a task and the analytical skills to make the best use of information for the successful resolution of problems and issues.

In my remarks this morning, I would like to highlight four themes: (1) the implication of this movement toward technology in our society; (2) the present status of our educational system as we look forward to greater use of technology: (3) efforts of the U.S. Education Department, particularly the Office of Educational Research and Improvement, in instructional technology; and (4) a commentary on the significance for the education field particularly health education.

(1) We in education face a great challenge and none greater than those of us in the field of technology. We are on the cutting edge of a revolution which will change every aspect of society. Time magazine in a recent year named the computer as its "Man of the Year". Newsweek and U.S. News and World Report magazines have featured stories on the race between the United States and Japan to build a supercomputer. More and more articles are focusing on the Fifth Generation Computer and artificial intelligence.

John Nesbitt, author of Megatrends: Ten New Directions Transforming Our Lives notes:

> "As we move from an industrial to an information society, we will use our brain power to create instead of our physical power, and the technology of the day will extend and enhance our mental ability".

We find a growing focus on not only computers, but new uses for television in education, videodiscs and increased interest in areas like cognitive science and artificial intelligence.

There is what is known as the fifth generation--a breed of super-computers so fast that they can surpass today's machines a thousand times over and so smart they can out think humans. This is not science fiction nor another Japanese scare story warns authors Edward Feigenbaum and Pamela McCorduck in their recent book The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World. Japan has predicted that it will be marketing such machines within a decade and have mounted an effort similar to the U.S. space effort. Authors Feigenbaum and McCorduck note:

> The Japanese expected these new computers, which users will be able to speak with in everyday conversational language, or show pictures to, or transmit messages to by keyboard or hand-writing, to penetrate every level of society. They will assume no special expertise or knowledge of arcane programming languages. They will not even require the user to be specific about his needs, because they will have reasoning power and will be able to tease out from the user, by questioning and by suggestions, just exactly what it is that the user wants to do or know. Finally, these new machines will be inexpensive and reliable enough to be used everywhere, in offices, factories, restaurants, shops, farms, and fisheries, and of course, homes. (p.8)

Is it any wonder that President Reagan, notably in his Seton Hall University speech, termed this Information Age as the beginning of another revolution ranging from tiny microchips to voyages into the infinity of space?

What will be the requirements of the adults we are preparing to function in the Information Age? We are going to need a literate population--people who can read and write and use analytical skills to

solve problems. We cannot expect students to master the more complex skills until they have mastered the basics first. And considering that we have in our nation possibility millions of seventeen and eighteen year olds as well as adults lacking the essential tool of functional literacy, we have a serious problem as a nation not only presently but in the next few critical decades.

We do not have the luxury of waiting for a solution or hoping some magic formula will make the problem disappear. Certainly the federal government alone cannot resolve the problem. We all must participate in improving our schools for our very survival not only as an educated people but as a free people is at stake.

How we approach the educational challenges which face us today will determine, in a very real sense, the quality of life and the ability to be productive citizens for those students now in school as well as those who will follow.

(2) The release of the National Commission on Excellence in Education report last April sounded like a firebell in the night--awakening our generation to a sudden and real danger. The Commission members, representing a wide variety of backgrounds and philosophical viewpoints, issued a unanimous report. They found an educational system in deep trouble. We were schooling many but really educating few. The sense of seriousness, alarm, and concern was reflected in the very title of the report, A Nation At Risk: The Imperative for Educational Reform.

Allow me to read some of the more alarming comments from the beginning of the report:

> "Our nation is at risk. Our once unchallenged preeminence in commerce, industry, science and technological innovation is being overtaken by competitors throughout the world...the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur--others are matching and surpassing our educational attainments....We have, in effect, been committing an act of unthinking, unilateral educational disarmament.

Our first reaction as educators might be to go on the defensive. We can deny the conclusions, blame others for this situation, or make excuses. First of all, the report presents compelling evidence for its conclusions. Second, we can blame others and I am sure we would all have our favorite targets but I am also convinced there is plenty of blame to go all around. And finally, we could plead exceptional circumstances--we are educating more children now in our system than in previous years, we are giving greater opportunities for less fortunate groups in our population, and we are offering a greater variety of choice to students.

These excuses ring hollow as we examine the need to give all children a quality education. Excellence and equity need to go hand-in-hand, not as separate or adverse goals. How do we benefit the poor and minorities by giving them a substandard education in the name of equity and fairness? Anything worth doing is worth doing well and our educational system must perform better.

Too often we have seen our educational system deteriorate from teaching the three R's (reading, 'riting, and 'rithmetic) to teaching the six R's--remedial reading, remedial 'riting, and remedial

'rithmetic. Isn't it amazing that we have so much time to devote to these remedial activities and not enough time to teach them correctly in the first place?

The findings and conclusions of the Commission were hardly a surprise to educators who have perceived these trends over the past few years. The same alarming trends were confirmed by other reports which were issued subsequently: The Action for Excellence report of the Task Force on Education for Economic Growth by the Education Commission of the States, the Report of the Twentieth Century Fund Task Force on Federal Elementary and Secondary Education Policy, and America's Competitive Challenge: The Need for A National Response, of the Business-Higher Education Forum.

These reports, as well as the focus of the discussions at the recent National Forum on Excellence in Education held in Indianapolis, Indiana, issued a clarion call to all of us to assess where we have been in education, where we are presently, and where we should be going. We realize that education is costly but ignorance is even more costly for a nation. We need to realize that money alone cannot resolve the problem. We are already spending a total of $230 billion per year on education, public and private. In fact, an excessive infusion of money could do more harm if it merely allows us to make the same mistakes with more resources. We not only need to do things better but we must do things differently.

The solution to our education problem is not difficult to discover but it is not going to be easy to bring about.

We are going to need a commitment to excellence in education.

We need to promote maximum achievement not just minimum competency.

We need to once again make schools academies of learning and not merely institutions which try experimental methods with no learning goals in sight, or try the latest fad to change student behavior and values, or try to solve all the social problems of our twentieth century society.

We need to bring discipline and order and decorum back into our schools for true learning can take place where order prevails, standards are in place, and teachers exercise authority.

We need to create an enthusiasm for areas like math, science, history, health education and to direct our young people to undertake a thorough education in preparing for jobs of the future. We need to keep our society in the forefront of economic development of the world nations.

(3) I do not need to instruct this distinguished audience in the technology revolution we are witnessing in our country. It is truly a grass roots movement. From the hand-held calculator to the plethora of video games to the desk top computer, we are moving rapidly toward the information society. I think that it is important in education that we recognize that this movement toward the use of technology is not just a fad but must be linked to excellence and solid academic achievement in education. We need to assist students to learn with, through, and about technology.

One of the pieces of evidence showing how rapid this change has been can be found in an article in the November/December 1983 issue of Electronic Learning on a view of "Technology, Education, and the States:

Two Years Later." In introducing Electronic Learning's third annual survey of the states, the article notes:

> In 1981, only one state advocated, by law, the instructional use of computers in its schools.
>
> This year six states require that schools teach their students computer skills. Twelve officially recommend it. And a total of 47 states have launched campaigns aimed at enabling their schools to impart those skills to their students.
>
> The message from EL's (Electronic Learning) latest survey of all the 50 state education agencies is clear: From Maine to Hawaii, state education agencies are working furiously to insure that schools under their aegis are entering the computer age. (p. 37)

The President, Secretary of Education T.H. Bell, and myself have long been interested in the great potential of technology applied to education. Instructional technology offers a means to enhance student learning, increase teacher productivity, and develop more effective schools.

Secretary Bell officially launched a department "Technology Initiative" in a national teleconference on June 22, 1982 which included participation by 45 states and almost six thousand educators. Consistent with the Reagan Administration effort to return more control to state and local governments, this initiative would not be a massive spending or intrusive program conducted by the federal government; it would provide assistance and aid to the States and localities to development technology to meet their own particular needs of students. The Secretary designated the Office of Educational Research and Improvement as the lead office to implement this "Technology Initiative".

One great boom to assisting the States has been the adoption of the Educational Consolidation and Improvement Act or block grant proposal which turned over almost thirty federal programs to the States to decide if they wish to continue these programs at the State and local level and at what financial commitment. This Chapter II program, as it is known, gave states both flexibility and resources. A number of surveys have revealed that States are using this block grant money to bring their schools and students into the computer age free from the restrictive and confining nature of federal categorical programs. This block grant proposal has provided federal financial assistance to States and localities for certain broadly defined purposes; the States have responded well to this new decentralized decision-making.

The National Commission on Excellence in Education struck a responsive chord with our colleagues when it recommended as part of its five basics one half year of computer science for all high school students. This half year computer science complements effectively the other recommended "new basics"--4 years of English, 3 years of mathematics, 3 years of science, and 3 years of social studies.

Allow me to highlight some of the work of the Office of Educational Research and Improvement in the field of technology.

OERI has provided training for thousands of State and local leaders in technology through such programs as Project BEST, Project SLATE, and Project VIM.

We are also using technology, educational television, to teach science through such programs as the "Voyage of the Mimi" and, in cooperation with the National Science Foundation, "3-2-1 Contact".

We are monitoring several contracts to utilize technology to improve the teaching of basic skills in the area of mathematics, science and writing. One of these is a unique communication program known as Project Quill which uses a set of microcomputer-based programs around which several instructional activities have been developed. The activities are geared to young writers in grades 3 to 6. Quill utilizes the microcomputer's technological capabilities to help teachers teach writing. The youngster's natural enthusiasm for anything connected with the computer strongly motivates them to write and to perform the various tasks which are a part of the program. It has helped to eliminate the drudgery of rewriting compositions by hand. Corrections and rewrites can be made quickly on the word processor and a print-out secured. The computer is being used to help students to write better, not as a replacement for the skill of writing.

The National Diffusion Network identifies exemplary programs and assists school districts to adopt and implement these exemplary program. It utilizes the knowledge of successful programs which can be used in other areas to bring the knowledge of good educational practices to other school districts and to avoid duplication of effort. We've been able to use the NDN network very effectively in assisting the technological revolution in our educational system.

First, the Secretary of Education, who has the authority to define areas of concentration for NDN, listed technology as one of the fourteen priority areas. In this list of priorities, attention will be given for computer science programs which aim to help students accomplish the following: (1) Understand the computer as an information, computation,

and communication device; (2) Use the computer to enhance instruction in English, mathematics, science, social studies, or for personal and work-related purposes; or (3) Understand the world of computers, electronics, and related technologies.

Second, the Secretary designated that a number of schools utilizing technology successfully should be designated by the NDN as "lighthouse schools." These schools receive extra funding to train other educators with the expectation that their experience will be replicated in other parts of the country. The response has been enthusiastic and satisfying. We now have ten "lighthouse" schools so designated with programs ranging from alternative occupation training in high technology for secondary school age students (some of whom had previously been high school dropouts) to more effective management of student records to using technology to improve math and reading skills.

An exciting new program announced late last year, and one which has been received with much enthusiasm, provided grants to twelve school-based technology demonstration projects. The funds for these grants were provided by the Secretary's Discretionary Fund. Schools were asked to identify a learning objective and devise a means where one or more technologies were used to accomplish an educational objective.

While most educators are excited about the use, and possible uses of technology, both in and out of the classroom, there has been a limited attempt to realize the full potential. The school-based demonstration projects provide good examples to follow. Through this program, we have identified excellent programs being offered, and utilized successfully, in many localities throughout the nation. This

program is designed to facilitate the sharing of the best of these programs with other state and local school districts. The ultimate goal is the widespread improvement in the use of technology for educational purposes.

In announcing the awards for these projects, which together totalled more than 1.5 million dollars, U.S. Secretary of Education, Terrel H. Bell said:

> The demonstrations by the selected schools will help answer many questions concerning the use of technology in the classroom. These outstanding projects will serve as excellent examples of how to use microcomputers and other electronic devices in striving to achieve excellence in education.

The demonstration sites are distributed throughout the United States; urban, suburban, and rural school districts are all represented.

Somewhat innovative in terms of grant programs--grant awards to local schools is a new approach for the Department--some examples of the high quality programs which were selected for grant awards are:

- the use of interactive technology to upgrade the knowledge and skills of physics teachers and, simultaneously deliver high-quality physics instruction to students. This program is located in Iowa and will involve the University of Northern Iowa in Cedar Falls working with 45 secondary schools.

- already noted for their innovative school/industry partnership, the Digital Equipment Corporation and the Lynnfield and Lexington, Massachusetts public schools will expand upon their cooperative efforts in the training of teachers to teach physics and chemistry. The schools will be assisted by Digital's IVIS system. Teachers will be trained to develop more software for use with the system.

- Also located in Massachusetts, the Network, Inc., will combine with three local school districts in a program designed to utilize the computer in the teaching of writing to students at the secondary level.

- o In Virginia, the Fairfax County Public Schools will use an extensive array of micros to extend computer-assisted instruction to the upper grades. Examples include: teaching math/problem solving in grades 5 to 8 and science in grades 9 to 12. Further, they are going to add word processing to their curriculum in grades kindergarten through 12. They will also provide additional teacher training in the use of microcomputers.

- o The Houston, Texas Independent School District will develop and disseminate technology-based programs in several areas, including computer literacy. Six public and one private high school will be involved.

Other school districts which will be involved include: all Coeur d'Alene, Idaho elementary and secondary schools; the University of Arizona, Tucson and the Glazier Elementary School at Norwalk, California; Western Kentucky University, Bowling Green and 10 middle schools in a consortium of 23 school districts, Montclair, New Jersey Board of Education with 6 elementary, 2 middle, and 1 high school participating; WICAT Education Institute, Provo, Utah will work with 3 schools in Provo, 1 school in Port Hueheme, California, and 1 school in a big Eastern city school system; and the Educational Communications Board, Madison, Wisconsin will involve all their local education agencies and all elementary schools in the state of Wisconsin.

These projects will be effectively monitored and reports prepared on what we have learned. These will be widely disseminated.

While training and dissemination has been important, we have not neglected some other areas of concern, particularly in statistics and research.

Our National Center for Education Statistics has established a panel of experts studying the meaning of computer literacy and conducted surveys on the extent of the use of computers in our schools.

We also realize the importance of bringing our best people together to look at the future of computers. OERI brought together forty top experts at a conference held at Carnegie-Mellon University and the University of Pittsburgh in November of 1982. The conference was an exceptional experience as these leading scholars explored the key research areas needed in using computers in mathematics, science, reading and writing. The report, Computers in Education: Realizing the Potential has already become a major document for identifying research into instructional technology.

The National Institute of Education, another component of OERI, has awarded a major contract to Harvard University for Education Technology Center to focus on research issues in technology, NIE is looking into a number of areas where computers impact on our educational system.

Let me mention a few other areas: we held a very successful conference in April of this year at the University of Wisconsin focusing on how to improve instruction in mathematics with some emphases on technology and expect a report out this year on that effort; we have had three contracts studying the available computer software in key areas of reading and writing, math and science, and foreign languages including English as a second language; we have been administering a Small Business Innovation Research program which has awarded contracts for small businesses in the utilization of technology contracts particularly to aid the handicapped.

The Reagan Administration has a positive view of our educational system. The federal role in leadership in education is an important role but it is nonetheless a limited one. There are no plans to return

to the type of programs offered in the 1960s in which large sums of federal monies were spent on a wide range of educational projects, some of little value. An excessive amount of federal aid could have a negative effect. We do not intend to provide an opportunity for computer companies to unload unneeded and outdated hardware on school systems or to get into controversial areas such as curriculum development, which may not meet the needs of schools throughout the country. In fact, a federal aid program might at this stage cause over investment and excessive development in certain fields.

The Reagan Administration is trying to stimulate an atmosphere which encourages schools to get involved with instructional technology, to share information on technology, and to get the private sector more involved in instructional technology. We have been particularly pleased with outstanding examples throughout the country of business-school partnerships designed to improve education.

(4) Allow me to comment on an area of concern to all of you. The prospects for the uses of technology in the health care field are indeed exciting. The role of health care professionals has in recent years been not only expanded but its significance increased.

Much of the new technologies offer expanded and improved teaching and learning in the classroom as well as in other and varied settings--such as learning resource centers--for the preparation of health care professionals. These advances can assist not only those who educate health care professionals but can be utilized by the health care professionals in patient care as well.

As I am sure you are aware, medical science is now enabling doctors to save and prolong the lives of patients who in past decades would have been hopeless cases. However, many of these patients require long term recovery periods. The health care professionals are the key, for most of these patients, to a full and complete recovery. The new technologies can be a partner for the health care professionals in providing improved services to both the patient and the patient's family.

Those now entering the health care field, and those who have the awesome responsibility of preparing those individuals for their careers, are entering a field in which changes and advancements will be rapidly taking place. Your organization has already recognized the value of media and technology in meeting the challenges such careers offer. By choosing to become a part of the technological revolution, you are choosing to offer those you plan to serve, the best you possibly can. I congratulate you on your professionalism and dedication to the training of the best possible health care professionals.

I urge you to continue your efforts in the beneficial work of your profession. We all have a great stake in the future of our educational system. If technology can make that system perform better we need to make the best use of it.

In "A Final Word", the National Commission on Excellence in Education noted that it hoped its recommendations will prepare children for far more effective lives in a far stronger America. However, it noted reform of our educational system will take time and unwavering commitment as well as energetic and dedicated action. It called upon scholarly, scientific, and learned societies for help in this effort.

All of you can play a role in this effort especially through your knowledge of technology. We Americans have triumphed before; we shall by working together triumph again.